d) a nucleotide sequence having at least 90% identity to a nucleotide sequence of a), b), or c); and

e) a nucleotide sequence encoding an antisense RNA of a nucleotide sequence of a), b), c), or d.

33. The plant of claim 32, wherein said nucleotide sequence is selected from the group consisting of:

a) a nucleotide sequence encoding a GDP-mannose pyrophosphorylase that is native to maize or a leguminous plant;

b) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:2;

c) a nucleotide sequence set forth in SEQ ID NO:1;

d) a nucleotide sequence having at least 90% identity to a nucleotide sequence of a), b), or c); and

e) a nucleotide sequence encoding an antisense RNA of a nucleotide sequence of a), b), c), or d).

REMARKS

Reconsideration of the present application is respectfully requested. Claims 1-14, 23, 24, 32, 33, 41-45, 49-59, 65-71, 73 and 76 are pending. Claims 1, 3, 4, 7, 8, 24, and 33 have been amended. Support for the amendments is found in the original claims. Claims 2, 6, 14, 49-59, 65-71, 73, and 76 have been cancelled without prejudice.

The marked up version of the claim amendments is found on a separate sheet attached to this amendment and titled "Version with Markings to Show Changes." It is respectfully requested that the amendment be entered.

Rejections under 35 USC §112, first paragraph:

3. Claims 1-14, 23-24, 32-33, 41-45, 49-59, 65-71, 73 and 76 stand rejected under 35 USC §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 2, 6, 14, 49-59, 65-71, 73, and 76 have been cancelled without prejudice.

The Examiner states: "... although the specification does teach specific maize GDP-mannose pyrophosphorylase, as well as conditions for hybridization of nucleic acid sequences to the disclosed GDP-mannose pyrophosphorylase sequences, such a disclosure does not reasonably convey to the skilled artisan that Applicant was in possession of the scope of the claimed sequences. The mere identification of such a sequence does not render the skilled artisan with a nucleic acid sequence which could be considered a GDP-mannose pyrophosphorylase. For instance ... any sequence having a 20 base region of homology to the disclosed sequence does not have the expectation that such a sequence would be considered a GDP-mannose pyrophosphorylase by function."

Independent claims 1, 24 and 33 have been amended to read: "... a nucleotide sequence encoding a *maize or leguminous* plant GDP-mannose pyrophosphorylase; ... a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:2; ... a nucleotide sequence set forth in SEQ ID NO:1; ... a nucleotide sequence having at least 90% identity to a nucleotide sequence [of any of the foregoing]; and ... a nucleotide sequence encoding an antisense RNA of a nucleotide sequence [of any of the foregoing]." Sequences that do not function as a plant GDP-mannose pyrophosphorylase (ie: inoperative embodiments) are not claimed.

As stated in the previous response, the test for sufficiency of support in a parent application is whether the disclosure of the application relied upon "*reasonably* conveys to the artisan that the inventor had possession at that time of the later claimed subject matter." (MPEP 2163.02) It is believed that the specification has provided sufficient disclosure and enablement so that one skilled in the art could readily make the embodiments encompassed by the amended claims.

The Examiner asserts: "... the MPEP states that the standard is 'whether a skilled person could determine which embodiments that were conceived, but not yet made, would be inoperative or operative with expenditure of *no more effort than is normally required in the art.*'"

The Examiner continues: "Even in cases of families of high homology, there are deviant proteins which do not function in a manner similar to the other family members. Thus each protein must be considered on an individual basis. The specification ... does not provide sufficient guidance to determine which of such sequences would be considered a GDP-mannose pyrophosphorylase."

It is respectfully submitted that the proper inquiry is not whether or not an artisan is likely to encounter one or more inoperative embodiments while screening for operative embodiments within the scope of the present invention. Rather, the inquiry should focus on whether one of skill in the art would, given the guidance provided by the specification, have a reasonable expectation of success in making isolated sequences commensurate with the scope of independent claims 1, 24 and 33 without having to perform more effort than is normally required in the art.

The applicants point out that a variety of functional assays are described in the specification at page 17, line 28 through page 18, line 3. It is the very provision of such screening systems that enables practitioners of the biotechnological arts to select that which is desired from that which is not.

The screening of a group of sequences containing from a few to many, inoperative species in order to isolate one or more operative species is a common

practice in many aspects of the biotechnological arts. With the guidance provided in the specification as cited herein and in the previous response, isolation of operative embodiments from a group of candidate sequences as claimed in current independent claims 1, 24, and 33, clearly has a reasonable expectation of success by one skilled in the art and would reasonably convey that the inventor had possession of the claimed subject matter.

4. Claims 1-14, 23-24, 32-33, 41-45, 49-59, 65-71, 73 and 76 stand rejected under 35 USC §112, first paragraph, because the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with the claims.

The Examiner states: " ... sufficient guidance is not supplied in the specification to teach one skilled in the art how to make other nucleic acid sequences, even by hybridization, which would be considered to make a maize GDP-mannose pyrophosphorylase having the disclosed utility. As such, one skilled in the art would necessarily practice "trial and error" experimentation beyond the disclosure to take any such sequence having the capacity to hybridize to the disclosed sequences and generating a functional maize GDP-mannose pyrophosphorylase ...."

The Examiner further asserts: "Additionally, there is a high level of unpredictability that any sequence which has a 20 base pair contiguous region of SEQ ID NO:1 or any antisense, fragments, or variants as broadly claimed would function as a GDP-mannose phosphorylase [sic] or to inhibit such a gene as broadly claimed."

Claims 2, 6, 14, 49-59, 65-71, 73, and 76 have been cancelled without prejudice.

Independent claims 1, 24 and 33 have been amended to read: "... a nucleotide sequence encoding a *maize or leguminous* plant GDP-mannose pyrophosphorylase; ... a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:2; ... a nucleotide sequence set forth in SEQ ID NO:1; ... a nucleotide sequence having at least 90% identity to a nucleotide sequence [of any of the foregoing]; and ... a nucleotide sequence encoding an antisense RNA of a nucleotide sequence [of any of the foregoing]." Sequences that do not function as a plant GDP-mannose pyrophosphorylase (ie: inoperative embodiments) are not claimed.

The case applying the undue experimentation standard is In re Wands where the court held that "the test is not merely quantitative, since *a considerable amount of experimentation is permissible*, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed." 8 U.S.P.Q.2d 1400, 1404 (Fed. Cir. 1988) [italics added]. In rejecting the Patent Office's position that because only 2.8% of the cell lines tested fell within the scope of the claim and that the isolation of inventive cell lines was unpredictable, the court emphasized that the skilled artisan, guided by the specification, could, nonetheless, reasonably expect to achieve antibodies commensurate with the scope of the claims.

As stated above, and in the previous response, one skilled in the art would reasonably expect that those nucleic acid molecules that have at least 90% identity to SEQ ID NO:1, and possess GDP-mannose pyrophosphorylase activity could be used in the presently claimed invention. The skilled artisan would recognize that the limitations of present Claim 1 are such that a majority of nucleic acid sequences encompassed by the claim would be expected to be functional. The functional and structural limitations of present Claim 1 preclude undue experimentation.

Methods for determining percent identities are well known and routine in the art and have been cited previously. Testing for GDP-mannose pyrophosphorylase

activity is also well known and cited on page 17 of the specification beginning on line 28.

In light of the above remarks, it is submitted that the specification enables one of ordinary kill in the art to make and use the claimed invention commensurate in scope with the present claims.

5. Claims 56-59 stand rejected under 35 USC §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention.

Claims 56-59 have been cancelled without prejudice or disclaimer. Applicants expressly reserve the right to file divisional applications or take such other appropriate measures deemed necessary to protect the subject matter of the cancelled claims.

CONCLUSION

On the basis of the above amendments and remarks, reconsideration of the application and it's allowance are respectfully requested.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES

In the claims:

Claims 2, 6, 14, 49-59, 65-71, 73 and 76 have been cancelled without prejudice.

Claims 1, 3, 4, 7, 8, 24, and 33 have been amended as follows:

1. An isolated nucleotide sequence selected from the group consisting of:
   a) a nucleotide sequence encoding a maize or leguminous plant GDP-mannose pyrophosphorylase;
   b) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:2;
   c) a nucleotide sequence set forth in SEQ ID NO:1;
   [d) nucleotide sequence comprising at least 20 contiguous nucleotides of SEQ ID NO:1;]
   d) [e)] a nucleotide sequence having at least 90% identity to a nucleotide sequence of a), b), or c) [or d)];
   [f) a nucleotide sequence that hybridizes to a nucleotide sequence of a), b), c), d) or e) under stringent conditions;] and
   e) [g)] a nucleotide sequence encoding an antisense RNA of a nucleotide sequence of a), b), c), or d)[, e) or f) ;and fragments and variants thereof].

3. The isolated nucleotide sequence of claim 1 [2], wherein said GDP-mannose is native to maize.

4. The isolated nucleotide sequence of claim 1 [2], wherein said leguminous plant is selected from the group consisting of beans and peas.

7. The expression cassette of claim 5 [6], wherein said GDP-mannose pyrophosphorylase is native to maize.

8. The expression cassette of claim 5 [6], wherein said leguminous plant is selected from the group consisting of beans and peas.

24. The plant cell of claim 23, wherein said nucleotide sequence is selected from the group consisting of:

a) a nucleotide sequence encoding a GDP-mannose pyrophosphorylase that is native to maize or a leguminous plant;

b) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:2;

c) a nucleotide sequence set forth in SEQ ID NO:1;

[d) a nucleotide sequence comprising at least 20 contiguous nucleotides of SEQ ID NO:1;]

d) [e)] a nucleotide sequence having at least 90% identity to a nucleotide sequence of a), b), or c) [or d)];

[f) a nucleotide sequence that hybridizes to a nucleotide sequence of a), b), c), d) or e) under stringent conditions;]and

e) [g)] a nucleotide sequence encoding an antisense RNA of a nucleotide sequence of a), b), c), or d)[, e) or f) ;and fragments and variants thereof].

33. The plant of claim 32, wherein said nucleotide sequence is selected from the group consisting of:

a) a nucleotide sequence encoding a GDP-mannose pyrophosphorylase that is native to maize or a leguminous plant;

b) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:2;

c) a nucleotide sequence set forth in SEQ ID NO:1;

[d) a nucleotide sequence comprising at least 20 contiguous nucleotides of SEQ ID NO:1;]

d) [e)] a nucleotide sequence having at least 90% identity to a nucleotide sequence of a), b), or c) [or d)];

[f) a nucleotide sequence that hybridizes to a nucleotide sequence of a), b), c), d) or e) under stringent conditions;] and

e) [g)] a nucleotide sequence encoding an antisense RNA of a nucleotide sequence of a), b), c), or d)[, e) or f) ;and fragments and variants thereof].